**THE PRACTICE OF BUILDING CONDITION ASSESSMENT IN PUBLIC SECTOR FACILITY MANAGEMENT**

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# Abstract

# The Total Asset Management Manual (TAMM) is introduced and implemented by Government of Malaysia to manage the government assets. The implementation of public sector facility and asset management is crucial and important to ensure the government building well managed and can serve the purpose for which it is constructed. Therefore, it is important to the professionals involved in managing the asset or facility to know and competent in the related field especially building condition assessment (BCA). The Standard guideline for BCA for Existing Building (JKR 21602-0004-13) is developed as a part of support document for TAMM. The purpose of this research is to conduct a review of the BCA practice in government buildings. The aim is to improve the government service delivery toward effective decision making for building maintenance. The research methods consisted of literature review and a quantitative approach to gather the observational data through inspection of three (3) Malaysia public office buildings. Inspections were performed by 42 building inspectors and the findings were analyzed by using Building Condition Assessment Rating System (BCARS). The total number of 1,745 defects have been identified with two (2) buildings at a good condition with a rating B at score 8.45 and 8.18 and one (1) building with C score 13.38 at fair condition. The results are then used to determine the need and remedial action to assess and maintain the desired level of service to improve the building facilities condition.

# Keywords:

Asset Management, Standard Guidelines, Building Condition Assessment, Building Inspector.

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# BACKGROUND OF STUDY

# Malaysia grows to have an important influence on infrastructure or asset development for the five decades from 1966 to 2016 (Yusof, 2008). However, the practice of asset management in Malaysia mainly focuses on the building operation, maintenance management, space management, and security management, but neglects the significance of performance monitoring (Yusof, 2013). The practice and performance of government assets and public assets typically adopts a reactive maintenance, ad hoc without systematic plan and schedule (Che-Ani et al, 2015). The reactive maintenance practice causes lower asset life, incur high maintenance cost, and reduces the quality of services. Subsequently, the government of Malaysia takes an initiative to implement the Total Asset Management (TAM) and introduces The Total Asset Management Manual (TAMM) to manage the government’s assets. The aim of TAMM is to provide the quality services to the citizens through provision of proper assets. It also emphasizes on the management of the government property assets in a systematic and holistic way to achieve optimum of the asset. The effective of asset management is to ensure the asset and facilities provided are manageable, and can serve the purpose for which it is constructed.

# LITERATURE REVIEW

# *Building Condition Assessment*

# Building condition assessment (BCA) is growing in the context of the built environment in Malaysia (Yacob, 2016). The condition assessment is a systematic process of evaluating to project repair, renewal or replacement needs to support the organization mission and activities (Rugless, 1993, Ahluwalia, 2008). Inspection is the process to assess the quality of a product or service in order to achieve certain standards (Wordsworth, 2001). Building condition assessment technically assesses the physical condition of the buildings (Abbott, 2007). The assessment involves the process of examining the entire building and components, such as mechanical systems and electrical, frame buildings, internal structure and finishes as well as building sites (Ramly, 2006).

# To respond to the challenges in managing and maintaining the asset in Malaysia especially for government building, BCA systems have been developed, which is Building Condition Inspection for Existing Building guideline (Yacob, 2016). A condition assessment system is performed primarily to facilitate the ranking of all the components of the asset according to the amount of needed repair, and to produce consistent, relevant and useful information (Ahluwalia, 2008). By knowing the objective, examination would allow examiners to take advantage of a limited time during site inspection. Maintenance can only be effectively managed if the maintenance demand is properly quantified (Abbott, 2007). Building performance is the foundation to ensure that the criteria developed to achieve the objectives. The structure, architecture, mechanical, electric, outdoor work, and building facilities are the complete set of components for building inspection evaluation based on maintainability, security, functionality and sustainability.

# RESEARCH METHODOLOGY

# Condition of buildings were assessed and collected through Building Condition Assessment (BCA) standard. The inspections were carried out at three (3) government buildings in Malaysia which is located at Kelantan, Kedah and Wilayah Persekutuan Labuan by 42 assessors from Public Work Department (PWD). They consisted multilevel of skill and discipline through training course and certified by PWD. The data collection was undertaken via field observation and document review of related case study. A quantitative method was adopted for analyzing the data drawn from BCA report and records of defect of the buildings.

# The BCA checklist was used with reference to the standard for registering the information of the building, identification, characterization, defects in functional element, evaluation of condition of defect, and maintenance action. The defects were illustrated with photographs and plan tags. The information in terms of the defects’ condition and priority were assessed. Afterward, the defect data were analyzed and summarized to identify the major defective elements. Data were sorted using Building Condition Assessment Rating System (BCARS) and then analyzed with frequency distributions. The score obtained from the BCARS scoring determine the five (5) level of defects such as score 1 to 5 - very good (green), score 6 to 10 - good (blue), score 11 to 15 - fair (grey), score 16 to 20 critical (yellow) and score 21 to 25 - very critical (red). The score of building condition rating was obtained by deriving the total mark of defects with total number of defects found in the building.

# RESULTS AND DISCUSSION

# The total defects from three (3) office buildings are 1,745. Table 1 shows that Building A recorded the highest number of 775 number of defects with a score 8.45 which at a good condition. Then, Building B has total defects of 773 and a score of 8.18, which indicates good condition. The score of Building C is 13.38 indicating fair condition, though only 196 defects are found. Despite the Building A and B are in a good condition and performed as intended, they still have minor defects to be supervised and repaired to ensure the functional of the building. Building C has major defects with a moderate condition. Whereby, it still can function with supervision. Nevertheless, it requires major repair and replacement works according to the maintenance priority assessment.

# Table 1: Total number of findings and score rating

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | Buildings | Location | Total Defects | Score | Rating |
| 1 | Building A | Kelantan | 775 | 8.45 | B - Good |
| 2 | Building B | Kedah | 773 | 8.18 | B - Good |
| 3 | Building C | Wilayah Persekutuan Labuan | 197 | 13.38 | C - Fair |

# Table 2 shows that the number of defects based on condition. The highest findings recorded for component is very good condition, with 712 findings (40.80%), followed by findings with good condition, cumulating 377 findings (21.60%). Finding with fair condition is third-ranked with 277 defects (15.87%); while for critical defects the total number is 226 (12.95%) and for very critical findings is 106 (6.07%).

# Table 2: The number of findings based on condition

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No Buildings | | Building Condition | | | | |
| Very Good | Good | Fair | Critical | Very Critical |
| 1 | Building A | 303 | 206 | 103 | 80 | 36 |
| 2 | Building B | 407 | 103 | 100 | 110 | 53 |
| 3 | Building C | 2 | 68 | 74 | 36 | 17 |
|  | Total | 712 | 377 | 277 | 226 | 106 |

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# There are 28 major components included in this study. Table 3 presents the only components that have more than 50 defects. The highest number of defects found at floors (349), followed by walls (339), ceilings (265), door (146), wirings (124), air conditioning system (88), and sanitary (83). The other components that are not listed in Table 3 have less defects and percentages such as fittings, windows, roof and others.

# Table 3: The number of defects based on component

|  |  |  |
| --- | --- | --- |
| Components | The numbers of Defects | Percentages |
| Ceiling | 265 | 15.19 |
| Door | 146 | 8.37 |
| Wall | 339 | 19.42 |
| Floor | 349 | 20.00 |
| Wiring | 124 | 7.11 |
| Air Conditioning | 88 | 5.04 |
| Sanitary | 83 | 4.76 |

# \*This table presents only component has >50 defects

# The data of the defects obtained from the process of inspection are useful to enhance and improve the condition of the buildings. In addition, the findings provide useful insight on the cause of defects, and type of defects tend to occur in the building element, which can be used as the input for maintainability and the use of building material during design stage. The defect data can produce a data access system and situate condition of the building easily and quickly for monitoring and decision-making purposes. Setting of priorities for maintenance work dealing with the risk of failure of the components is a way to tackle problems within limited of maintenance budgets. By using the BCA standard, the actual condition of the component or buildings, maintenance planning, budgeting can be determined and recorded systematically and comprehensively. Furthermore, the captured and recorded condition of each building element can generate the list of the defects, rating and maintenance action, as well as deterioration curve for the building.

# CONCLUSIONS

# The benefits of the implementation of the BCA are clearly demonstrated in managing and maintaining the government assets. For the building inspection of office building, it is reveals that the overall condition of two office building is in good condition and one is in fair condition. The buildings still needs to be supervise and repair work according to the maintenance priority assessment to ensure the functional of the building. The study determined the common defects at the element of the building. Building element such as floor, wall and ceiling have more defects compared to other elements. Therefore, building element that are closely related to most defects should be prioritized. Besides that the implication of this study also helped the management have a better plan and prioritize the maintenance activity. The results of the standard BCA can produce a condition of buildings that can be referred as a data access system easily and quickly. The assessment and setting of priorities for planned maintenance works from BCA is a way to tackle problems of shortage of maintenance funds.

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